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ABSTRACTS OF TECHNICAL REPORTS

ACAE Workshop

C.D. McLeod, P. Milburn, and G.C. Misener

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INTRODUCTION

J. Higgins

Chairman, ACAE

The Atlantic Committee on Agricultural Engineering held its Eighth Annual Workshop in Charlottetown, PEI on February 22-25, 1988. The Workshop was very interesting and informative, and I can say,without hesitation, that it was a success.

There were 18 technical papers presented. Abstracts of these papers are contained in this publication. Three concurrent workshops were also held in Soil & Water, Power & Machinery, and Structures; we were fortunate to have very high calibre workshop leaders.

We were able to maintain our tradition of having the President of CSAE with us for our sessions. Mr. Ron Britton from the University of Manitoba attended in that capacity. Ron also served as a workshop leader for part of the Structures workshop and spoke to the whole group on CSAE activities.

A highlight of the past year was the completion of the video on the Profession of Agricultural Engineering. Dr. Chris Watts from TUNS co-ordinated and supervised the production. This is a 13-minute broadcast quality video sponsored by CSAE, ACAE, McCains, ALICA and the Atlantic Farm Mech Show. The video was viewed at our workshop sessions, and all of the comments were favourable. We thank Chris for his efforts and the very excellent job of putting this video together.

I wish to acknowledge those who presented papers at our workshop, and I especially want to thank the Local Arrangements Committee for their planning and co-ordination efforts.

Recent Developments and Projects at AFMI

J.D. MacAulay

Nova Scotia Research Foundation Corporation, Dartmouth, NS

AFMI was incorporated as a non-profit organization in 1985 to facilitate research, development, and testing of farm machinery in and for Atlantic Canada. The Nova Scotia Research Foundation Corporation (NSRFC) was authorized to carry out work on behalf of AFMI and to seek ways to enhance the level of equipment technology available to Atlantic Canadian farmers.

As a result, seven projects relating to equipment for the production and processing of agriculture products have been completed by the Project Services Section of NSRFC. The projects were carried out on behalf of sponsoring agencies or firms, and most have been conducted with the technical involvement of one or more co-operating government departments, colleges, producer associations, dealers, and farmers.

A formal proposal is presently being prepared by NSRFC seeking funds to equip and staff a renewable resource machine applications centre which would serve the agricultural, forestry, fisheries, and aquacultural industries. The plan is modelled after the AFMI experience, and agricultural mechanization work is expected to comprise a major part of the activities of the proposed facility.

Development of Discrete Time Soil Erosion Measurement for PEI

Paul Frame, Jack Burney, and Linnell Edwards

Technical University of Nova Scotia, Halifax, NS

Three sub-watersheds in the Upper Wilmot River watershed in central PEI have each been instrumented with a Parshall flume to record discharge. A flow splitter and sediment sampler have been designed and are being tested for fitting to each Parshall flume to collect discrete time samples of complete sediment concentration.

Within each sub-watershed, a set of three soil erosion plots has been installed. Runoff from each soil erosion plot flows through a HS flume (for runoff rate measurement), a mixing section (for discrete time sediment sampling) and into a sequence of three barrels connected by flow dividers (for manual measurement of mass runoff and sediment on an event basis). Sediment samplers under gravity feed have been designed for use on each plot.

Varying size H flumes have been constructed for monitoring outflow from demonstration terrace systems located in PEI. An energy dissipating and mixing section has been designed for installation following the H-flume at each site. A pump-driven discrete sediment sampler, similar to those on the Parshall flumes, will be installed to sample from each mixing section.

Data from the above installations will facilitate modeling as well as determine seasonal and annual soil loss values from a range of treatment effects.

Humane Disposal of Day Old Cockerel Chicks

J.D. Cunningham

Nova Scotia Agriculture College, Truro, NS

The hatching of chicks produces 50% pullets and 50% cockerels. In the production of laying hens, the cockerels are of no value (except for a few of the lucky ones) since they do not produce eggs and they are of little meat value; hence they must be terminated at infancy. Traditionally, these cockerels have been left to suffocate in a container as other neonatal chicks are discarded on top of them.

Chick hatchery operators and the Canadian Federation of Humane Societies (CFHS) have become aware of this apparently inhumane method of disposal and have begun investigating other more acceptable methods. The CFHS is in the process of finalizing a "Recommended Code of Practice for Handling Poultry from Hatchery to Slaughterhouse". The latest draft of this Code specifies acceptable and unacceptable methods of disposing of unwanted chicks, with maceration and carbon dioxide inhalation being the two most acceptable methods at present.

Work has been undertaken at N.S.A.C. in co-operation with a chick hatchery, to develop an acceptable method of using carbon dioxide in a commercial hatchery operation. Tests have shown that the gas renders chicks unconscious within 15 seconds; the CFHS stipulates that chicks must be maintained in an environment of 60% carbon dioxide for 1 minute to prevent their revival.

The method being tested consists of purging a garbage can's plastic bag liner of air through the introduction of heavier carbon dioxide; placing the chicks in the garbage bag during sexing as is currently being practiced; and "topping-up" the carbon dioxide prior to removal of the bag for disposal. This will ensure that the chicks succumb to a humane death and that they are maintained in the carbon dioxide environment until their disposal.

The Use of Weighted-pressure Belts on Potato Harvesters

C.D. McLeod and G.C. Misener

Agriculture Canada, Research Station, Fredericton, NB

Two developments at Fredericton have expanded the use of anti-roll belts by increasing the weight or by applying pressure to the upper side of the belt contacting the bed. The weight belt was tested for its ability to hold tubers onto a digger bed sloped at 60° to the horizontal. The results also included tuber damage assessments, an analysis of forward to bed speed ratios, and soil sieving ability. Several other miner operating assumptions were verified as well.

The pressure belt is used to hold tubers on the primary bed of the prototype potato harvester when it is being agitated, to improve soil separation and clod removal. It is made with a 1.5 mm thick rubber belt with a v-belt bonded to the center on the inside for tracking the system. There are five air inflated rubber rollers between the belt rotating on fixed shafts connected at the ends to a common side frame located outside the belt edges. The frame is connected to the harvester at the front with a flexible link. The spring adjustment on the flexible link, the roller frame, and roller location control the ultimate belt pressure at any point.

The belt also forms a component of a new vine removal system that has some unique features and can remove vines, while retaining tubers, and can also remove large flat stones and sod.

Tests have shown that soil can be eliminated at forward speeds up to 4.5 km/h, depending on moisture content, and mechanical injury of tubers can be maintained at low level while vine and sod removal remains satisfactory.

Effect of Mechanical Injury of Potatoes on the Quality of the Product Leaving Storage

G.C. Misener and C.D. McLeod

Agriculture Canada, Research Station, Fredericton, NB

The effect of mechanical injury of potatoes was evaluated based on the product quality of the potatoes after storage at ten commercial facilities. The results of this investigation indicated that the amount of mechanical injury imparted to potatoes during harvesting and subsequent handling was the most significant factor affecting the percentage of marketable tubers. Normal mechanical harvesting as conducted in New Brunswick resulted in 60.1 percent more post storage losses of marketable potatoes compared to potatoes that had been hand harvested. However, the proportion of the loss that was weight loss (moisture) from the potatoes was not significantly affected by the damage level. The extent of ventilation and humidication capabilities of the storages was reflected in both lower storage loss and weight loss of the product leaving storage.

The results suggested that the damage level of the potatoes entering storage had a very significant effect on the quality of the product leaving storage. Within the damage index, the inclusion of the black spot classification was found to significantly decrease the marketable yield. Efforts to minimize the injury imparted to potatoes during harvesting and handling need to be stressed to minimize loss of marketable product. Emphasis on the development of harvesters capable of harvesting potatoes with minimum damage need to continue.

Comparison of Measured and Estimated Values for the Saturated Hydraulic Conductivity of the Soil

Gordon Murray

Nova Scotia Agriculture College, Truro, NS

Infiltrometer, core, and permeameter methods for determining the saturated hydraulic conductivity of the soil were compared to the estimation method outlined in McKeague and Wang (1986). The permeameter consistently gave the largest values relative to the other methods but was closest to the estimated values. No significant difference was found between methods on texturally dominated soils, but statistical differences occurred on structurally dominated A horizons. Estimated values were shown not to be a reliable source of data for design criteria.

Round Bale Silawrap Demonstration

C. Everett[1] and C. Esau[2]

[1]NB Department of Agriculture, Fredericton, NB

[2]Agriculture Canada, Research Station, Fredericton, NB

A Kverneland Underhaug Silawrap machine for round wrapping hay and silage was demonstrated and evaluated under New Brunswick conditions. Project objectives were to collect operating data, to compare the system to round bale bagging, tunneling and stacking systems, and to demonstrate the system to farmer groups in five New Brunswick regions. At the Fredericton Research Station, wrapped silage bales were compared to bales stored in three different types of plastics. The Injector Wrap System, used to inject anhydrous ammonia into round bales and wrap them in plastic, was also tested.

Recent Developments in Technology Viewed at the Canada International Farm Equipment Show

Tony Glencross

PEI Department of Agriculture, Charlottetown, PEI

Development in farm machinery as viewed at the Canadian International Farm Equipment Show, Toronto, Feb. 2-5 1988.

Electronics and microprocessors are evident throughout the agricultural machinery industry. Tractors, chemicals application equipment, seeding, crop conditioning, animal and crop ventilation are now all being sensed, monitored, adjusted, and recorded electronically. Computers are making their way rapidly into the farm office as well.

The mergers and consolidations that have occurred in the industry were very evident. Major innovation is slowing down in the industry due to the downturn in sales. The companies are using every possible opportunity for improving manufacturing efficiencies.

Product improvements are showing up in place of the major new innovations, generally. Case - IH has introduced a new line of microprocessor-monitored tractors called the "Magnum" line.

Development of an Inexpensive Instrument Means to Determine Sprayer Droplet Size

A.B. Kinnie and K.C. Watts

Dept. of Agricultural Engineering, Technical University of Nova Scotia, Halifax, NS

In order to deposit agricultural chemicals efficiently on plants, it is necessary to have a sprayer with a controlled droplet size. However, determination of the size of droplets, a prerequisite in the development and evaluation of a controlled droplet sprayer, cannot be accomplished accurately and inexpensively at present. This paper presents progress on the development of an inexpensive device, with its attendant computer, to determine the size of agricultural sprayer droplets.

The electro optical device used to convert video to electrical signals is a 128 element linear charged coupled device (CCD) which can be operated up to 10 MH_Z photodiode element sweep frequency. The output of the CCD can be processed in one of several methods to obtain the size of water droplets passing by it. The method chosen uses a threshold detector in which an "on" or "off" signal is formatted in a digital string which in turn is transmitted to a high speed buffer and later sent to a Tandy Model 100 Computer for analysis. The speed of operation needs to be high to capture as many shots as possible of a single droplet as it passes in front of the element. This allows both the maximum dimension of the droplets as well as their velocity to be determined.

The output of this device should give an absolute value. However, to check the functioning of the system, an apparatus that produces droplets of known size was constructed. To generate a droplet of a given size, a tube having a specific internal diameter and through which a certain flow rate of water is passing is vibrated piezoelectrically at a specified frequency.

Cleaning Devices on Air to Air Heat Exchangers

Marcel P. Levesque

NB Department of Agriculture, Fredericton, NB

The project report describes the design, development, and testing of automatic cleaning systems for plate type, crossflow air to air heat exchangers employed in livestock buildings. The research was funded as part of Agriculture Canada's ERDAF program, contract number OSZ83-00096; DSS file number 34SZ.01916-3-EC52.

Design and preliminary bench testing were performed by the engineering staff of A & E Engineering Ltd., after which the firm conducted in situ performance trials in a commercial chicken broiler growing facility that was made available to the researchers by Amicitia Farms Ltd., Palmerston, Ontario. Trials were carried out during the period November 1984 to May 1985.

Results of the testing and performance trials are given in the report. Technical and economic implications are described, and the practical, technical, and economic conclusions arising from the research are also presented.

Comparison of Mower Conditioner Drying Rates

Finbar Desir

Nova Scotia Agriculture College, Truro, NS

Five mower-conditioners and one mower were tested in fields of alfalfa and reed canary. The average drying rates of crop windrows formed by the five machines were compared, as well as crop losses determined. The experiment compared different types of conditioners, so machines were selected with similar mowers. Windrow samples were placed on trays and weighed at frequent intervals. Crop loss samples and yield measurements were collected. Analysis of the results showed only marginal differences in the drying rates of windrows from the machines. Flail type conditioners inflicted heavier losses in alfalfa than roller type conditioners, but neither caused any measurable losses in the reed canary.

Effects of Intensive Potato Production on Shallow Groundwater Quality as Indicated by Systematic Subsurface Drainage Discharge

P. Milburn[1], C. Gartley[2], and J. Richards[1]

[1]Agricutlure Canada, Research Station, Fredericton, NB

[2]NB Department of Agriculture, Wicklow, Florenceville, NB

A co-operative 2-year ERDA project by Agriculture Canada, the NB Department of Agriculture, and Environment Canada is described and results from the first field season (1987) are summarized.

Water samples collected at the drain outlet from five systematically drained potato fields in the upper Saint John River valley were analyzed for nitrates and selected pesticides. Drain discharge rate and mid-spacing water table height were also measured at the experimental sites. The timing and quantity of agricultural chemicals applied during the growing season were recorded and 5-year field histories were determined.

Nitrate levels in excess of water quality guidelines were detected; however, total drain discharge volumes from the field sites were low in 1987. Land use, climatic conditions, soil type, total drain outflow, and time of chemical applications must be considered when interpreting the data. The project will continue in 1988.

Three Dimensional X-Ray Technique for Determining Seed Placement

A.J. Campbell[1] and C.J. Baker[2]

[1]Agriculture Canada, Research Station, Charlottetown, PEI, CANADA

[2]Agricultural Mechanization Research Centre, Massey University

Palmerston North, NEW ZEALAND

The objectives of this study were to develop and document a reliable, workable X-ray technique for identifying seed placement in the soil, to examine those factors which might influence this procedure and to demonstrate the use of the technique in a field experiment.

When X-rayed within a soil mass, seeds coated with a heavy metal powder appeared on the X-ray film as white or grey images on a dark background. A coating procedure (based on commercial pelleting) was developed to apply red lead oxide powder to the seed. As the seed images on the X-ray film were to be a shadow representation of the actual seed position in the soil mass, a correction procedure to locate the true positions of the seed was developed.

Neither soil type nor soil moisture content appeared to have a marked affect on the clarity of the X-ray images. Seed germination was not affected by the amount of red lead oxide coating, the coating procedure, or exposure to moderate levels of radiation. Soil blocks measuring 75 mm by 75 mm by 240 mm long containing the coated seeds should be taken as soon as possible after sowing, as image clarity diminished over time and seed movement occurred in the case of seeds with epigeal germination.

The X-ray technique had the ability to detemine three-dimensional seed placement within a soil mass (sowing depth, in-row width and in-row spacing). The ability of the X-ray technique offers new possibilities for explaining those factors which affect seed placement by direct drilling equipment in field situations.

Sensitivity Analysis of Subsurface Drain Spacing Equations

Peter Havard and Ali Madani

Nova Scotia Agriculture College, Truro, NS

Three steady state and two transient flow subsurface drainage spacing equations were examined. Parameters used in these equations included saturated hydraulic conductivity, hydraulic head above the level of the drain, and the effective flow depth below the drain. The results with the varied parameters were graphed to illustrate the sensitivity of calculated drain spacing.

It was found that the spacing has less variation over a range of effective depths at low hydraulic conductivities. This implies in soils of low conductivity (less than 0.1 m/day) little error is caused by inaccuracies in estimating the depth to the impermeable layer. However, at higher levels the spacing calculated is much more sensitive or prone to error with variations in the depth to impermeable layer.

The five equations, in general, compared well though certain combinations of variables could generate different results, but these were usually outside the normal range used. It is important to understand the effect of the input parameters to the design equation; these equations should only serve as a guide until better experience is gained with the particular soil type or more rigorous methods of design and field investigation are developed.

Development of a Grain Head Chop Harvester

Carl Esau

Agriculture Canada, Research Station, Fredericton, NB

The cost of conventional grain combining equipment is often prohibitively high for small mixed farms in the Atlantic Region. This presentation describes the development of a low cost harvester which cuts and chops the immature head portion of the grain plant for use as silage.

The prototype harvester is a semi-mounted implement which requires a 35 to 40 kw tractor. The crop is cut using four hydraulically driven rotary cutters 533 mm in diameter that overlap to give a cutting width of 1830 mm. A blower transports the harvested material to a forage wagon. The crop cutting height control system is fully automatic with optional manual control.

Diversion Terraces Demonstration Project on PEI

Ron DeHaan

PEI Department of Agriculture, Charlottetown, PEI

In 1987 a project was initiated by the Engineering Section of the PEI Department of Agriculture to demonstrate effectiveness of parallel diversion terraces in reducing sheet and rill erosion losses to tolerable levels. Diversion terraces along with suitable outlets were established on a total of 87 ha (215 acres) at 4 sites across PEI. The presentation addresses the need for a demonstration project of this type on PEI, presents slides of the actual installations, and discusses proposed monitoring of the sites.

Odor Control of Manure Lagoons Using Peat Moss

Kevin J. McKendy

NB Department of Agriculture, Bathurst, NB

During the summers of 1986 and 1987, a project to demonstrate the use of Peat Moss to control odours from hog manure was carried out at Ferme Godin in Pokemouche, NB. The project was funded by the Canada-New Brunswick Agrifood Agreement and was conducted by Dr. Jean-Yves Daigle of the University of Moncton.

Peat moss was used to cover a lagoon and was also mixed with liquid hog manure and used for composting. Trials were also conducted using the composted material as a soil amendment.

This presentation describes the methods employed and the project results.

Progress Report on the Evaluation of Vicon Electronic Controls on Fertilizer Spreaders

John Adsett

Nova Scotia Agriculture College, Truro, NS

Preliminary field and lab tests were conducted to evaluate the performance of an electronic control system (Vicon Model ED820). This system is designed to enable a constant broadcast application rate of fertilizer or seeds to the field, in spite of variations in tractor forward speed.

Field testing with collection trays was carried out on three farms to determine actual application rates over a range of rate settings at various forward speeds. Lateral spread patterns of various fertilizer components and of different forage seed types were also recorded.

A tractor forward speed simulator was designed, constructed, and used in the lab to determine the response of the electronic control system to changes in simulated forward speed and to provide a check on field testing.

The Vicon electronic control system showed good response to simulated forward speed changes in the lab. Measured application rates in the field were generally lower than the rate settings and indicated a rough pyramidal profile with the highest rate near the tractor centerline. The low field collected rates were believed due to particles bouncing away from the tops of collection tray partitions. Sieve analysis indicated that, with blended fertilizers, the larger particles were distributed fairly evenly across the spreading width, whereas smaller particles were concentrated in the one-half of the spread width closest to the tractor centerline.

Chemical analysis indicated that the actual chemical composition of samples of 17-17-17 fertilizer was quite consistent over the full lateral spread width. Seed counts revealed that most seeds were concentrated within the center one-half of the spread width.

CONCURRENT WORKSHOPS:

Power and Machinery I

Agricultural Electronics on Farm Machinery

Lyle Switzer*

Vicon Manufacturing Ltd., Cambridge, ON

The theme emphasized during the presentation of Electronics in Agriculture was that the operator does not have to understand how the processor functions. It is not a computer, so only information is exchanged with the operator and the functions performed by the electronic instruments are not altered or modified during use. Sales staff also use this approach to speed the acceptance of electronic processors on agricultural machinery.

Two projects were treated in detail and included automatic fertilizer application adjustments with variations in actual forward speed which is a new feature for a Vicon spreader. The second project centered on a portable electronic mini weather station that is also a Vicon product.

Other electronic equipment just becoming available included a fully automated milking station that is now in use in Europe.

For a futuristic look at where the industry might go, the concept of a portable information cassette was presented. This cassette would record all pertinent operating parameters existing during one operation to control the applications and settings on each subsequent operation. For this concept to be viable, a large variety of specialized sensors capable of operating under severe stress conditions would be necessary. Soil moisture, pH, pathogen, and insect detection equipment would be an example of some of the sensors required to make full use of the concept.

*Presentation summarized by C.D. McLeod

Power and Machinery II

Climatic Considerations for Machinery Selection

George Read

NB Agriculture, Fredericton, NB

Climate plays a major role in many areas of agricultural production. The probability of receiving favourable or adverse weather for such activities as tillage, planting, cultivation, spraying, harvesting or storage is essential information for designing machinery to get the job done when and where it is most efficient and economical.

An important first step in using this information is to obtain representative data and to be familiar with the range and variability of the data over time. Topography and large water bodies exert a sizeable modification in temperature and precipitation values. These influences are evident not only from one general region to another, but also at the parish or even farm level.

Climatic information can define the growing potential of an area and thus provide the basis for crop selection, equipment considerations and the economic projections of various options. Several climate related phenomena such as the date of planting, the scheduling of harvests, the amount and frequency of irrigation, or the probability of successful crop drying and storage all can be regulated to a greater or lesser extent by the appropriate engineering design. By using the corresponding climatic data associated with these operations, engineers can project and plan the most cost-effective alternative for the producer.

Power and Machinery III

Machinery Management Computer Programs

A. Bruce Kinnie

Technical University of Nova Scotia, Halifax, NS

Two farm machinery management programs for use on IBM compatible microcomputers were discussed. The first, by S.R. Freesmeyer of Iowa State University, optimizes implement size based on workday probability. Due to a lack of this type of local information and the fact that the program, which is written in interpretive Basic, is extremely slow in both data entry and in execution, participants felt that workshop time could be better spent by working with the TUNS program.

The TUNS Custom Rate Program has been an ongoing project at TUNS since requested by the ACPM subcommittee in 1981. This program, based on the British Columbia Custom Rate Guide, gives a cost breakdown which includes depreciation, interest, housing, insurance, fuel, lubrication, labour, and anticipated repair cost. Early versions of the program ran on the mainframe computer and extension engineers received a large printout of management data. Newer editions for use on IBM compatible microcomputers have become fully interactive and allow extension workers to generate detailed cost breakdowns for not only individual machines but also for machinery systems. Participants had a chance to try the program on the microcomputers provided and make any suggestions for further modifications.

CONCURRENT WORKSHOPS:

Soil and Water I

Estimating Watershed Runoff

Paul I. Welle

USDA Soil Conservation Service, Chester, PA

A technical workshop was conducted addressing watershed runoff estimation procedures. USDA Soil Conservation Service's (SCS) methods for computation of runoff volume and peak flow for small watersheds were discussed with particular emphasis on the assumptions and limitations of the procedures. Our discussion included the studies made prior to and during the development of the procedures with emphasis on the underlying concepts and data sources. The objective was to allow the participants to determine when the procedures can be used for soil and water conservation measure design in the Atlantic Provinces. Methods for developing data such as temporal rainfall distriubtions specific to the Atlantic Provinces were discussed.

The SCS's Technical Release 55 (2nd Edition), Urban Hydrology for Small Watersheds, was used as a framework for the discussion of the SCS runoff equation, time of concentration procedures, and peak flow computation. The Rational Method for estimating peak flow was briefly discussed and compared to the SCS procedures in terms of its assumptions, limitations, and data requirements. The TR-55 computer program was demonstrated.

Soil and Water II

Erosion Control

Donald E. McCandless, Jr.

USDA - Soil Conservation Service, Chester, PA

Information presented to Soil and Water Engineers, Atlantic Committee on Agricultural Engineers (ACAE) February 24-25, 1988, Prince Edward Island.

The SCS procedures for designing grass waterways and diversions were discussed utilizing Chapters 7 and 9 from Engineering Field Manual as a handout reference. The new procedures in USDA Agricultural Handbook #667 "Stability Design of Grass-Lined Open Channels" were briefly discussed. A companion computer program was demonstrated.

The Universal Soil Loss Equation (USLE) was discussed. Participants were provided an abstract of plans to develop new procedures under the Water Erosion Prediction Project (WEPP). These new procedures are currently being developed by USDA - Agricultural Reseach Service.

A color-slide presentation was made describing grade stabilization structures made from rock, treated timber and/or concrete blocks. The importance of timely maintenance of all conservation practices was stressed.

CONCURRENT WORKSHOPS:

Structures and Environment I

Manure Storage and Treatment

J. Poss*

Consultant, Guelph, ON

An update on manure storage and treatment systems was presented with an emphasis on aerobic processes. Composting techniques, problems, and solutions were discussed and floating aerators, both fixed and mobile, were reviewed. Mixing, sedimentation, and an aerobic condition occur during aeration cycles and all contribute to overall system performance. A review of anaerobic waste treatment systems including fixed film reactors was also presented.

An update on the status of the Canadian Farm Builders Association after a recent reorganization completed the presentation, and the desirability of a Maritime Chapter was expressed.

*Presentation summarized by C.D. McLeod

Structures and Environment II

Earth to Air Tempering Systems

Dr. R. Britton*

University of Manitoba, Winnipeg, MB

A report was presented on research work studying the use of underground ducts for altering the thermodynamic state of ventilation air before entering the end use distribution system. A detailed analysis of air temperature and humidity profiles in the system during heating and cooling cycles was presented. Dynamic and static thermal regimes in the soil were also presented and discussed.

*Presentation summarized by C.D. McLeod

Structures and Environment III

A Methane Digester

A. Wilting*

Farmer, Charlottetown, PEI

The experience of operating a methane digester for a two-year period to provide supplementary electricty for a hog farm was presented. The unit was a batch digester with incremental slug loading and discharging. Incrementally changing loads prevented large changes in the operating environment in the digester and prevented discharging large bacterial populations at one time. At time periods there was a surplus of electricity produced by the generating system. Some problems were encountered with the internal mixing system and often manure was needed and obtained from a neighbouring poultry operation. The project was funded by a co-operative farmer-government effort.

*Presentation summarized by C.D. McLeod

Structures and Environment IV

New Guidelines on Manure Handling

G. Linkletter*

PEI Department of Agriculture, Charlottetown, PEI

The background for the new guidelines now being applied to manure handling systems on PEI was presented. A printed copy of the guidelines was given to the people present to provide the details for review and future consideration.

*Presentation summarized by C.D. McLeod